



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry
Region 3
1650 Arch Street, 3HS00
Philadelphia, PA 19103

Mr. and Mrs. Kiskadden

[need address]

Ms. Kelly A. Smith
Applied Research & Technical Support Branch, Chief
U.S. Environmental Protection Agency
ORD/NRMRL/GWERD
919 Kerr Research Drive
Ada, Oklahoma 74820

June 14, 2013

Dear Mr. and Mrs. Kiskadden :

The U.S. Environmental Protection Agency (EPA) collected samples from your private water well as part of their national study of the potential impacts of hydraulic fracturing on drinking water resources. EPA collected samples from your private water well in March 2012 and shared a copy of the results from their analyses with you. The water analyses included general water quality parameters (e.g., pH, redox potential, dissolved oxygen, Total Dissolved Solids), general water chemistry parameters (e.g., cations and anions, including barium, strontium, chloride, boron), metals and metalloids (e.g., arsenic, barium, selenium), radionuclides (e.g., radium), volatile and semi-volatile organic compounds, and polycyclic aromatic hydrocarbons.

Per EPA's request to the Agency for Toxic Substances and Disease Registry (ATSDR), this letter serves as a written follow-up to our conversation on March 28, 2013 with you and EPA about the test results. ATSDR compared your private water sampling results with health-based comparison values. As we discussed together, ATSDR concluded that your well water is not of good quality for drinking (not potable).

The concentrations of some of the chemicals detected in your groundwater were above health-based comparison values, secondary standards for drinking water quality, and/or safety guidelines. Health based comparison values are established by ATSDR for non-cancer and cancer health endpoints. These values are not health effects levels and additional evaluation is made when a sample concentration is above this value to determine if health effects are likely to occur. Secondary drinking water standards (also known as secondary Maximum Contaminant Levels or sMCLs) are non-enforceable guidelines for contaminants that may cause aesthetic effects (such as taste, odor, or color) in drinking water or nuisance effects (such as scale, staining, or corrosion).¹ Specifically:

- Sodium (265,000 micrograms per liter (µg/L) or parts per billion (ppb)), pH (8.93), and total dissolved solids (TDS) (666,000 µg/L or ppb), all exceeded their respective secondary drinking water quality standards in your water sample (20,000 µg/L, 6.5-8.5, and 500,000 µg/L, respectively). Drinking water with elevated sodium levels (>20 mg/L) is a health concern for people on sodium restricted diets. Any one drinking from this water supply and on a sodium restricted diet should discuss this additional source of dietary sodium with their physician. ATSDR expects that, in addition to the sodium level, the pH and TDS levels in your water sample would negatively impact the potability of this water supply.

¹ More information available at U.S. EPA, "Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals," <http://water.epa.gov/drink/contaminants/secondarystandards.cfm>.

- The methane level (15,500 µg/L or ppb) in your water sample exceeded a warning level of 10,000 µg/L or ppb established by the U.S. Department of the Interior (<http://www.osmre.gov/resources/newsroom/News/Archive/2001/090601.pdf>). At this level, ATSDR recommends the installation of a combustible gas monitor in your home, ventilation of the home, ventilation of the well head, and removal of ignition sources in enclosed areas of the home. This is based on an increased safety risk from the potential buildup of methane gas indoors. Ingestion of methane in drinking water is not considered a health concern.
- Arsenic in your water sample (1.0 micrograms per liter (µg/L) or parts per billion (ppb)) is below EPA's standard for this chemical in public drinking water supplies (10 µg/L or ppb), but it exceeded ATSDR Cancer Risk Evaluation Guideline (0.02 µg/L or ppb) for this chemical. Daily consumption of your water with this concentration of arsenic could result in a very low estimated additional cancer risk.
- Diesel Range Organics (DRO) (87.9 µg/L or ppb) were also detected in your well water. The public health significance of detections of this group of compounds is not well defined. DRO may be an indicator of contamination from petroleum compounds.

Based on this information, ATSDR recommends that you appropriately treat this drinking water source or use an alternative water source for your drinking water. It is important to carefully consider your options when making decisions about appropriate water treatment. Resources and expertise are available from the Penn State Extension Program and Master Well Owner Network.² Even if you are not drinking from this water well, ATSDR recommends that you take precautionary steps to address the safety hazard related to the methane level in your well water as described above. Any private well owner, regardless of where they live, should have their drinking water tested on a regular basis. The Penn State Extension Program offers well water testing at low costs, and their gas/oil water testing package includes testing for total coliform bacteria, E. coli bacteria, pH, total dissolved solids, barium and chloride. You can visit the Penn State Extension lab testing website (http://www.aasl.psu.edu/Water_drinking_main.html) or call the Washington County Penn State Extension office at (724) 228-6881 for more information on private water well testing through the Penn State Extension.

If you have any additional questions please feel free to contact me.

Sincerely,


Karl V. Markiewicz, PhD
 Senior Toxicologist
 ATSDR Region 3
 (215) 814-3149
 kvm4@cdc.gov

cc: Dr. Sharon Williams-Fleetwood, ATSDR DCHI Eastern Branch Chief
 Dr. Tina Forrester, ATSDR DCHI Division Director (Acting)
 Dr. Kandiah Sivarajah, PADOH
 Victoria Binetti, EPA Region 3 Water

² Penn State Extension, "Home Water Treatment in Perspective," <http://extension.psu.edu/natural-resources/water/converted-publications/home-water-treatment-in-perspective>.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry
Region 3
1650 Arch Street, 3HS00
Philadelphia, PA 19103

Ms. Stacey Haney

U.S. FOIA (b)(6)

Ms. Kelly A. Smith
Applied Research & Technical Support Branch, Chief
U.S. Environmental Protection Agency
ORD/NRMRL/GWERD
919 Kerr Research Drive
Ada, Oklahoma 74820

June 14, 2013

Dear Ms. Haney:

The U.S. Environmental Protection Agency (EPA) collected samples from your private water well as part of their national study of the potential impacts of hydraulic fracturing on drinking water resources. EPA collected samples from your private water well on July 28, 2011 and on March 26, 2012 and shared a copy of the results from their analyses with you. The water analyses included general water quality parameters (e.g., pH, redox potential, dissolved oxygen, Total Dissolved Solids (TDS)), general water chemistry parameters (e.g., cations and anions, including barium, strontium, chloride, boron), metals and metalloids (e.g., arsenic, barium, selenium), radionuclides (e.g., radium), volatile and semi-volatile organic compounds, and polycyclic aromatic hydrocarbons.

Per EPA's request to the Agency for Toxic Substances and Disease Registry (ATSDR), this letter serves as a written follow-up to the conversation on April 9, 2013 with you and EPA about the test results. As we discussed together, ATSDR concluded that your well water is not of good quality for drinking (not potable). At EPA's request, ATSDR compared your private water sampling results with health-based comparison values.

The concentrations of some of the chemicals detected in your groundwater were above health-based comparison values and/or secondary standards for drinking water quality. Health based comparison values are established by ATSDR for non-cancer and cancer health endpoints. These values are not health effects levels and additional evaluation is made when a sample concentration is above this value to determine if health effects are likely to occur. Secondary drinking water standards (also known as secondary Maximum Contaminant Levels or sMCLs) are non-enforceable guidelines for contaminants that may cause aesthetic effects (such as taste, odor, or color) in drinking water or nuisance effects (such as scale, staining, or corrosion).¹ Specifically:

- The manganese levels (330 and 2200 micrograms per liter (µg/L) or parts per billion (ppb)) detected in your well water in both sampling events exceeded the secondary drinking water standard for this chemical (50 u/L or ppb). The maximum manganese level detected in March 2012 could result in exposure doses for children under 10 years of age that exceed dietary guidelines for this chemical. There is uncertainty in estimating typical daily manganese exposures from food. This maximum level of manganese could be of health concern for adults as well, when evaluating the combined exposure from drinking this water with typical exposures from food.

¹ More information available at U.S. EPA, "Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals," <http://water.epa.gov/drink/contaminants/secondarystandards.cfm>.

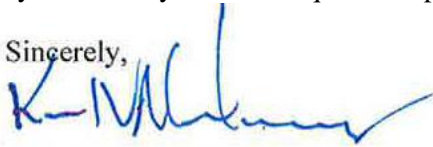
- The iron level (383 µg/L or ppb) in your March 2012 sample exceeded the secondary drinking water standard for this chemical (300 µg/L or ppb). Elevated levels of iron in drinking water may affect the taste and color of the water. Individuals on iron-reduced diets due to certain health conditions, such as hemochromatosis, should discuss this with their physician and be aware of this additional source of iron in their diet.
- The bromide level (2,400 µg/L or ppb) could result in a slightly elevated level of bromide ingestion for a child. ATSDR estimated this using a World Health Organization (WHO) guideline derived from essentially a no adverse effect level in humans for total dietary intake of inorganic bromide. WHO's acceptable daily intake (ADI) for inorganic bromide in humans is 0–1 milligram per kilogram body weight. ATSDR used this guideline to compare estimated exposures for adults and children using a drinking water source with this level of bromide. The public health significance of this additional amount of bromide in a child's diet is uncertain, and would depend on other contributions of bromide in the child's diet.
- Arsenic in your water sample (0.78 µg/L or ppb) is below EPA's standard for this chemical in public drinking water supplies (10 µg/L or ppb), but it exceeded ATSDR Cancer Risk Evaluation Guideline (0.02 µg/L or ppb) for this chemical. Daily consumption of your water with this concentration of arsenic could result in a very low estimated additional cancer risk.
- ATSDR does not have a comparison value for formate (310 µg/L or ppb), which was detected in your July 2011 water sample. Different forms of this chemical occur naturally in foods and are used as food additives. Current food manufacturing practices result in maximum levels of ethyl formate in served food from 0.01-0.05 percent (or 100,000-500,000 ppb). After you ingest it, formate is quickly cleared by your body. Based on this information, ATSDR believes the concentration of formate in your drinking water does not present a health concern.
- Three additional man-made chemicals (2-butoxyethanol, butyl benzyl phthalate, and phenol) were detected in your well water but at levels below health based comparison values for these chemicals.
- Diesel Range Organics (DRO) (73.8 and 84.4 µg/L or ppb) was also detected in your well water in both sampling events. The public health significance of detections of this group of compounds is not well defined. DRO may be an indicator of contamination from petroleum compounds.

ATSDR understands that you have voluntarily relocated your family at this point, and are no longer using this drinking water supply.

Based on this information, ATSDR recommends that any future users of this water supply appropriately treat this drinking water source or use an alternative water source for their drinking water. It is important to carefully consider your options when making decisions about appropriate water treatment. Resources and expertise are available from the Penn State Extension Program and Master Well Owner Network.² Any private well owner, regardless of where they live, should have their drinking water tested on a regular basis. The Penn State Extension Program offers well water testing at low costs, and their gas/oil water testing package includes testing for total coliform bacteria, E. coli bacteria, pH, total dissolved solids, barium and chloride. You can visit the Penn State Extension lab testing website (http://www.aasl.psu.edu/Water_drinking_main.html) or call the Washington County Penn State Extension office at (724) 228-6881 for more information on private water well testing through the Penn State Extension.

If you have any additional questions please feel free to contact me.

Sincerely,



Karl V. Markiewicz, PhD
Senior Toxicologist
ATSDR Region 3
(215) 814-3149, kvm4@cdc.gov

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Dr. Tina Forrester, ATSDR DCHI Division Director (Acting)
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Victoria Binetti, EPA Region 3 Water

² Penn State Extension, "Home Water Treatment in Perspective," <http://extension.psu.edu/natural-resources/water/converted-publications/home-water-treatment-in-perspective>.



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Mr. and Mrs. Voyles

U.S. FOIA (b)(6)

Ms. Kelly A. Smith
Applied Research & Technical Support Branch, Chief
U.S. Environmental Protection Agency
ORD/NRMRL/GWERD
919 Kerr Research Drive
Ada, Oklahoma 74820

June 14, 2013

Dear Mr. and Mrs. Voyles,

The U.S. Environmental Protection Agency (EPA) collected samples from your private water well and surface water on your property as part of their national study of the potential impacts of hydraulic fracturing on drinking water resources. EPA collected these samples in July 2011 and March 2012 and shared a copy of the results from their analyses with you. The water analyses included general water quality parameters (e.g., pH, redox potential, dissolved oxygen, Total Dissolved Solids (TDS)), general water chemistry parameters (e.g., cations and anions, including barium, strontium, chloride, boron), metals and metalloids (e.g., arsenic, barium, selenium), radionuclides (e.g., radium), volatile and semi-volatile organic compounds, and polycyclic aromatic hydrocarbons.

Per EPA's request to the Agency for Toxic Substances and Disease Registry (ATSDR), this letter serves as a written follow-up to the conversation on March 12, 2013 with you and EPA about the test results. As we discussed together, ATSDR concluded that your well water is not of good quality for drinking (not potable). At EPA's request, ATSDR compared your private water sampling results with health-based comparison values.

The concentrations of some of the chemicals detected in your groundwater were above health-based comparison values and/or secondary standards for drinking water quality. Health based comparison values are established by ATSDR for non-cancer and cancer health endpoints. These values are not health effects levels and additional evaluation is made when a sample concentration is above this value to determine if health effects are likely to occur. Secondary drinking water standards (also known as secondary Maximum Contaminant Levels or sMCLs) are non-enforceable guidelines for contaminants that may cause aesthetic effects (such as taste, odor, or color) in drinking water or nuisance effects (such as scale, staining, or corrosion).¹ Specifically:

- Aluminum (69.7 micrograms per liter (µg/L) or parts per billion (ppb)), sodium (24,100 and 24,600 µg/L or ppb), and total dissolved solids (TDS) (531,000 and 581,000 µg/L or ppb) concentrations exceeded their respective secondary drinking water standards in your water (50-200 µg/L or ppb, 20,000 µg/L or ppb, and 500,000 µg/L or ppb, respectively). Elevated levels of aluminum and TDS levels may result in drinking water that is discolored and/or cloudy. Drinking water with elevated sodium levels is a health concern for sensitive populations. Any one drinking from this water supply and on a sodium restricted diet should discuss this additional source of dietary

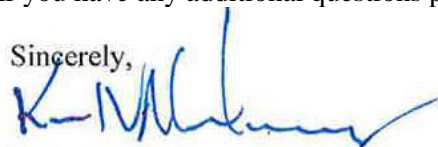
¹ More information available at U.S. EPA, "Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals," <http://water.epa.gov/drink/contaminants/secondarystandards.cfm>.

sodium with their physician. ATSDR expects that, in addition to the sodium level, the aluminum and TDS levels in your water would negatively impact the desirability and drinkability of this water supply.

- Nitrate and nitrite levels (17,700 and 23,000 µg/L or ppb) were elevated in your well water during both sampling events. EPA's standards for nitrate and nitrite in public drinking water supplies are 10,000 µg/L or ppb and 1,000 µg/L or ppb, respectively. Excessive nitrate/nitrite exposure can result in acute acquired methemoglobinemia (inability of iron in blood to release oxygen to body tissues), a serious health condition, particularly for infants.
- Arsenic in your March 2012 water sample (1.2 µg/L or ppb) is below EPA's standard for this chemical in public drinking water supplies (10 µg/L or ppb), but it exceeded ATSDR Cancer Risk Evaluation Guideline for this chemical (0.02 µg/L or ppb). Daily consumption of your water with this concentration of arsenic over a lifetime could result in a very low estimated additional cancer risk.
- The bromide levels in your water samples (2,050 and 3,030 µg/L or ppb) could result in a slightly elevated level of bromide ingestion for a child. ATSDR estimated this using a World Health Organization (WHO) guideline derived from essentially a no adverse effect level in humans for total dietary intake of inorganic bromide. WHO's acceptable daily intake (ADI) for inorganic bromide in humans is 0–1 mg/kg body weight. ATSDR used this guideline to compare estimated exposures for adults and children using a drinking water source with this level of bromide. The public health significance of this additional amount of bromide in a child's diet is uncertain, and would depend on other contributions of bromide in the child's diet.
- ATSDR does not have a comparison value for formate (200 µg/L or ppb), which was detected in your July 2011 water sample. Different forms of this chemical occur naturally in foods and are used as food additives. Current food manufacturing practices result in maximum levels of ethyl formate in served food from 0.01-0.05 percent (or 100,000-500,000 ppb). After you ingest it, formate is quickly cleared by your body. Based on this information, ATSDR believes the concentration of formate in your drinking water does not present a health concern.
- Diesel Range Organics (DRO) (26.9 and 27.1 µg/L or ppb) was also detected in your well water in both sampling events. The public health significance of detections of this group of compounds is not well defined. DRO may be an indicator of contamination from petroleum compounds.

Based on this information, ATSDR recommends that you appropriately treat this drinking water source or use an alternative water source for your drinking water. It is important to carefully consider your options when making decisions about appropriate water treatment. Resources and expertise are available from the Penn State Extension Program and Master Well Owner Network.² Any private well owner, regardless of where they live, should have their drinking water tested on a regular basis. The Penn State Extension Program offers well water testing at low costs, and their gas/oil water testing package includes testing for total coliform bacteria, E. coli bacteria, pH, total dissolved solids, barium and chloride. You can visit the Penn State Extension lab testing website (http://www.aasl.psu.edu/Water_drinking_main.html) or call the Washington County Penn State Extension office at (724) 228-6881 for more information on private water well testing through the Penn State Extension.

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